

# Educating K-12 Students about Glacier Dynamics in a Changing Climate



UMaine NSF GK-12 Program

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CLIMATE CHANGE  
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## Task Overview

In order to understand how glaciers affect our global climate and sea level, we must first understand how glaciers move and what influences their speed.

## Standards

*National Science Education Standards addressed:*

- ✓ Science as Inquiry-Content Standard A
- ✓ Energy in the Earth System-Content Standard D
- ✓ History and Nature of Science-Content Standard G

*Benchmarks for Science Literacy addressed:*

- ✓ The Nature of Science
  - 1B-Scientific Inquiry
  - 1C-The Scientific Enterprise
- ✓ The Physical Setting
  - 4B-The Earth
  - 4C-Processes that Shape the Earth
  - 4F-Motion
- ✓ Common Themes
  - 11A-Systems

## Objective

Student will be able to determine which of the following parameters – slope, ‘ice’ temperature, or basal condition – affects the glacier speed the most.

## Materials

3 PVC tubes (sandpaper, normal, and lubricated)

Mix #1	Mix #2
1 cup white glue	$\frac{1}{2}$ cup warm water
$\frac{3}{4}$ cup warm water	2 tsp Borax
food coloring (optional)	

## Procedure

Design an experiment to test what influences glacier speed. You should test different temperatures of ice (‘Flubber’), different ‘valley’ slopes and basal conditions. To determine the velocity, make sure you measure (with a ruler) how far the ‘Flubber’ moves in a given amount of time.

Velocity Table:

	<b>Blue (cold)</b>	<b>White (normal)</b>	<b>Red (warm)</b>
<b>Sandpaper PVC</b>	Dist: Time: Velocity:	Dist: Time: Velocity:	Dist: Time: Velocity:
<b>Normal PVC</b>	Dist: Time: Velocity:	Dist: Time: Velocity:	Dist: Time: Velocity:
<b>Lubricated PVC</b>	Dist:	Dist:	Dist:

	Time: Velocity:	Time: Velocity:	Time: Velocity:
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	<b><i>Blue (cold)</i></b>	<b><i>White (normal)</i></b>	<b><i>Red (warm)</i></b>
<b><i>Slope - shallow</i></b>	Dist: Time: Velocity:	Dist: Time: Velocity:	Dist: Time: Velocity:

### Assessment

- 1.) What did each one of the PVC tubes represent in the real world?
- 2.) What was the difference in flow rates between the sandpaper and the lubricated PVC using the cold 'Flubber'?
- 3.) What would happen to each of the rates if you increase the slope of the flows?

### Additional info: :

[http://www.geology.um.maine.edu/geodynamics/AnalogWebsite/Projects2003/Sterns\\_Osterberg\\_2003/index.html](http://www.geology.um.maine.edu/geodynamics/AnalogWebsite/Projects2003/Sterns_Osterberg_2003/index.html)

<http://www2.umaine.edu/USITASE/teachers/activityideas.html>